THE EPIDEMIOLOGY OF PHYTOPHTHORA RAMORUM AND P. KERNOVIAE AT TWO OUTBREAK SITES IN SCOTLAND

APPENDICES

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Appendix A

The DNA extraction buffer used for the soil and spore trap extractions was made as follows:

Buffer (per litre):

- 21.4g Sodium Phosphate Na2HPO4
- 20g CTAB (Hexadecyltrimethylammonium Bromide)
- 87.7g Sodium Chloride NaCl
- 1l sterile distilled water
- Heat stir (hand hot), adjust to pH 8

Appendix B

The V8 + antibiotic agar media was made up as follows:

V8:

Distilled water	900ml
Agar (VWR)	20g
$CaCO_3$	3g
V8 Juice	100ml

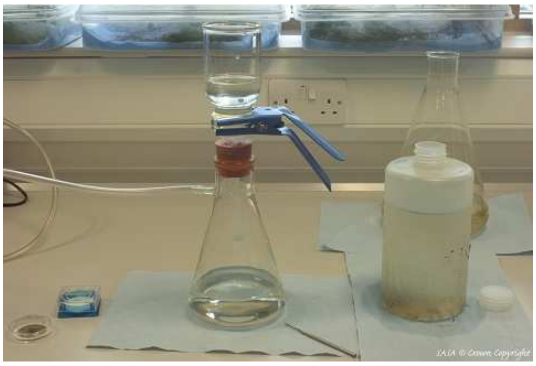
Additions (antibiotics) after autoclaving:

Pimaricin	0.02g
Ampicillin	0.2g
Rifampicin	0.01g
PCNB (Pentachloronitrobenzol)	0.025g
Nystatin	0.05g
Hymexazol	0.05g

Appendix C

The 2 litre water samples from the spore traps were processed as follows:

The collected water samples were forced through a 47mm diameter 3µm membrane filter using a vacuum pump (see photograph).



The filters were then cut into small pieces and put into a 50ml centrifuge tube containing 2ml of DNA extraction buffer (see appendix A).

They were then vortexed for 60 seconds to draw out the sporangia and zoospores from the membrane filter.

The 50ml tubes were placed into a linear/shaking water bath at 60^{o}C for an hour with a shaking speed of 150 strokes/minute.

At this point the Nucleospin® Plant Kit (Macherey-Nagel, Cat. No. 740 570 250) is used for the subsequent DNA extraction.

300µl is removed from the 50ml tube and added to a Nucleospin® Filter Column and centrifuged at 11,000g for 5 minutes to remove the unwanted debris.

The flow-through is transferred into a new 1.5ml centrifuge tube and 300µl of buffer C4 and 200µl of ethanol are added to adjust the DNA binding conditions, inverting the tubes 2-4 times to mix.

The sample is then loaded into a Nucleospin® Plant Column and processed according to the manufacturer's guidelines.

After this the samples can be stored at -20℃ until required for PCR.

Appendix D

The soil samples were processed as follows:

Soil samples were air dried for 4-5 days. They were then ground in a large plastic bag with a roller and shaken vigorously to mix them thoroughly.

12 stainless steel ball bearings were put into a mixing bowl from the mill, the pre-mixed soil was added to within 1cm of the top (a volume of about $150cm^3$) and 130ml of DNA extraction buffer (see procedure A) was poured into the bowl. The samples were then milled at 300rpm for 5 minutes.

Two 2ml aliquots were taken from each mortar into 2ml centrifuge tubes and a 50ml centrifuge tube can be filled with the rest of the milled soil for future use if required. At this stage the samples can be frozen at -20^oC until required for DNA extraction.

A robotic workstation for DNA extraction based on magnetic-particle purification (e.g. Qiagen Biosprint 15) and the Wizard Magnetic DNA purification system for food (Promega Cat. No. FF3750) was used for DNA extraction from the soil (protocol provided by FERA).

The two 2ml sub-samples were centrifuged for 2 minutes at 5,000g. 500µl of supernatant was removed from each of the 2 tubes and transferred to a new 2ml centrifuge tube containing 250µl Buffer B.
750µl of precipitation solution was then added and the tubes were vortexed before they were centrifuged at 13,000g for 10 minutes.
750µl of the resulting supernatant was transferred to a new 2ml tube and the magnetic beads, used in the robotic purifier, were vortexed to re-suspend them and 50µl added, ensuring beads did not settle by swirling the bottle throughout.
600µl of isopropanol was added and then vortexed before the tubes are incubated for 5 minutes at room temperature with occasional mixing by inverting.
The sample was then added to the first tube in the robotic workstation rack.

The DNA present in the sample binds to the magnetic beads which allows the bound DNA to be moved on magnetic rods in the machine through a series of incubation and washing steps as follows:

Well A – Sample with magnetic beads
Well B – 1ml Buffer B (incubation step)
Well C – 1ml 70% ethanol (washing step)
Well D – 1ml 70% ethanol (washing step)
Well E – 200µl molecular grade water (elution step)

The 'gDNA New' program (Qiagen Biosprint 15) was used. The DNA solution (Well E) was pipetted into sterile 1.5ml centrifuge tube and stored at -20℃ until required

Appendix E

25µl of reaction mixtures were used for the Real-Time PCR containing:

Component	**Amount (µl)**
Double distilled H_20	8
Taqman Master Mix*	12.5
Forward Primer (5 molar concentration)	1.5
Reverse Primer (5 molar concentration)	1.5
Taqman Probe (5 molar concentration)	0.5
DNA (Sample)	1

* Taqman Universal Master Mix, No AmpErase UNG (Applied Biosystems, part No. 4324018) containing DNA polymerase and dNTPs

The primers and probes sequences are as follows:

P. ramorum:

Pram 114-FC	5’ - TCA TGG CGA GCG CTT GA - 3’
Pram 1527-190-R	5’ - AGT ATA TTC AGT ATT TAG GAA TGG GTT TAA AAA GT - 3’
Pram 1527-134-T	5’- [FAM] - TTC GGG TCT GAG CTA GTA G - [TAMRA] - 3’

P. kernoviae:

Pkern 615F	5’ - CCG AAC AAT CTG CTT ATT GTG TCT - 3’
Pkern 722R	5’ - GTT CAA AAG CCA AGC TAC ACA CTA - 3’
Pkern 606T	5’- [TET] - TGC TTT GGC GTT TGC GAA GTT GGT - [TAMRA] -3’

TET and FAM were the dyes used and TAMRA was the quencher.

The thermal cycler programme used was an initial 10 minute denaturing stage of 94^{o}C, then:

$$\left.\begin{array}{l}\text{15 seconds at } 94^oC \\ \text{60 seconds at } 60^oC\end{array}\right\} \text{ x 40 cycles}$$

Appendix F

Analyses were conducted using the R Project statistical software package (version 2.15.2; R Development Core Team 2012, Vienna, Austria).

1. Spatial soil model Benmore (*P. ramorum*)

Binomial GLM using the *glm* function in R.

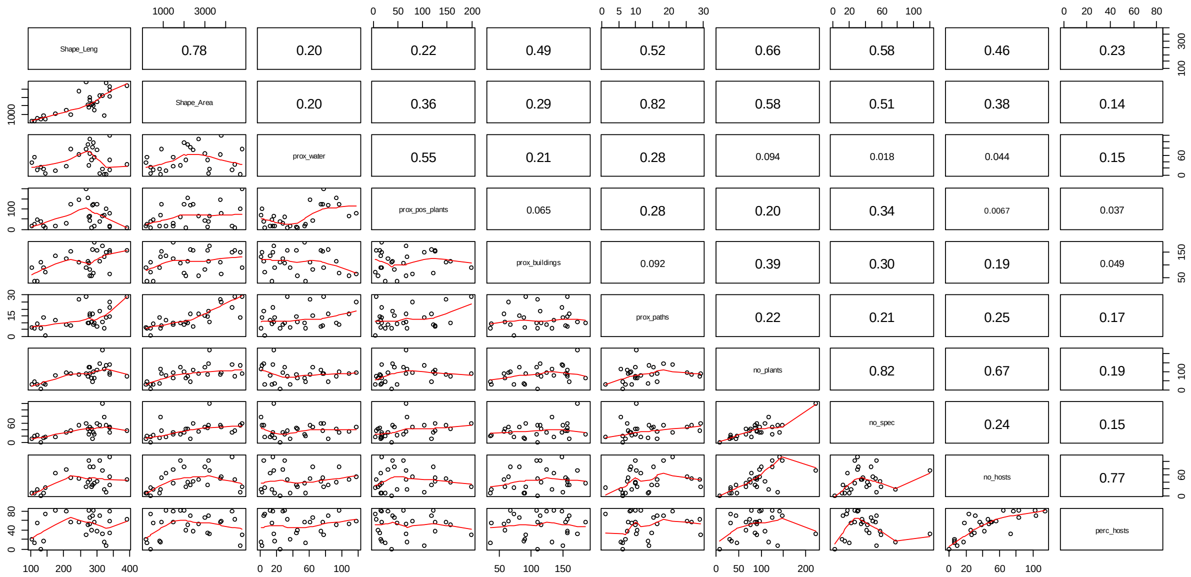
Response variable is ‘visit’ (how many times a bed was positive out of the total number of times it was visited throughout the study) created as follows:

```
visit <- cbind(ram$pos_event,(ram$events-ram$pos_event))
visit
```

Checked for correlation in explanatory variables using Spearman’s rank order correlation as follows:

```
new <-
ram[,c('Shape_Leng','Shape_Area','prox_water','prox_pos_plants','prox_build
ings','prox_paths',
            'no_plants','no_spec','no_hosts','perc_hosts')]
new
panel.cor <- function(x, y, digits=2, prefix="", cex.cor, ...)
{
    usr <- par("usr"); on.exit(par(usr))
    par(usr = c(0, 1, 0, 1))
    r <- abs(cor(x, y))
    txt <- format(c(r, 0.123456789), digits=digits)[1]
    txt <- paste(prefix, txt, sep="")
    if(missing(cex.cor)) cex.cor <- 0.8/strwidth(txt)
    text(0.5, 0.5, txt, cex = cex.cor) # * r)
}
pairs(new[1:10], lower.panel=panel.smooth, upper.panel=panel.cor)
```

This produces the following correlation table:



Full model:

```
model2 <- glm(visit ~ Shape_Area+prox_water+prox_paths+no_spec+perc_hosts+
            prox_buildings, data=ram, family=binomial)
```

Best model after backward selection:

```
model2c <- glm(visit ~ prox_water+perc_hosts+prox_buildings, data=ram,
family=binomial)
```

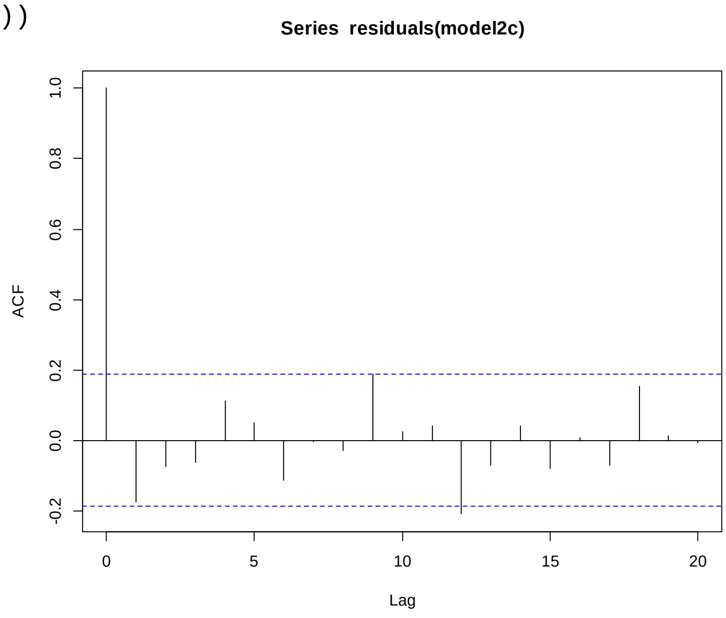
Output:

```
Call:
glm(formula = visit ~ prox_water + perc_hosts + prox_buildings,
    family = binomial, data = ram)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.9137  -1.1804  -0.8709   1.0510   4.4645

Coefficients:
                Estimate Std. Error z value Pr(>|z|)
(Intercept)     2.042111   0.815745   2.503  0.01230 *
prox_water     -0.026905   0.008235  -3.267  0.00109 **
perc_hosts      0.017673   0.008214   2.152  0.03143 *
prox_buildings -0.013849   0.005699  -2.430  0.01511 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 105.195  on 27  degrees of freedom
Residual deviance:  85.844  on 24  degrees of freedom
AIC: 103.39
```

Overall deviance explained ($\frac{null\ deviance - residual\ deviance}{null\ deviance}$) is 18%

A correlogram was produced to check for autocorrelation in the residuals using the *acf* function:

```
acf(residuals(model2c))
```



Autocorrelation was identified in the model because of the close proximity of the beds. This was accounted for using the integrated nested Laplace approximation (INLA) package in R as follows:

Downloaded and installed INLA from:
```
>source("http://www.math.ntnu.no/inla/givemeINLA.R")
library(INLA)
library(pixmap)
library(spdep)
library(maptools)
```

Shapefile created containing the sampled beds with their predicted risk for infection:
```
BS <- readShapePoly(("Benmore_soil_predictions.shp")[1])
plot(BS, axes=TRUE, border="gray")
```

Created adjacency matrix where any bed within 10m is considered to be contiguous:
```
nc.nb <- poly2nb(BS,snap=10)
```

Convert the adjacency matrix into a file in the INLA format:
```
nb2INLA("nc.adj", nc.nb)
```

Created areas IDs to match the values in nc.adj
```
nc.nb$ID<-1:28
```

Loaded data
```
ramorum <-read.csv("benmore_prox_pr_all.csv", sep=",", header=T)
```

Number of positive visits to bed
```
ram$pos_event
```

Number of visits to bed
```
ram$events
```

Whether bed was ever positive or negative
```
ram$pos_beds
```

Modelled beds using number positive visits out of total visits:
```
formula =
pos_event~perc_hosts+prox_buildings+prox_water+f(nc.nb$ID,model="besag",
graph.file = "nc.adj")
mod.PA.S =
inla(formula,family="binomial",Ntrials=events,data=ram,control.compute=list
(dic=TRUE),control.data=list(link="logit"))
summary(mod.PA.S)
```

Output from this model:

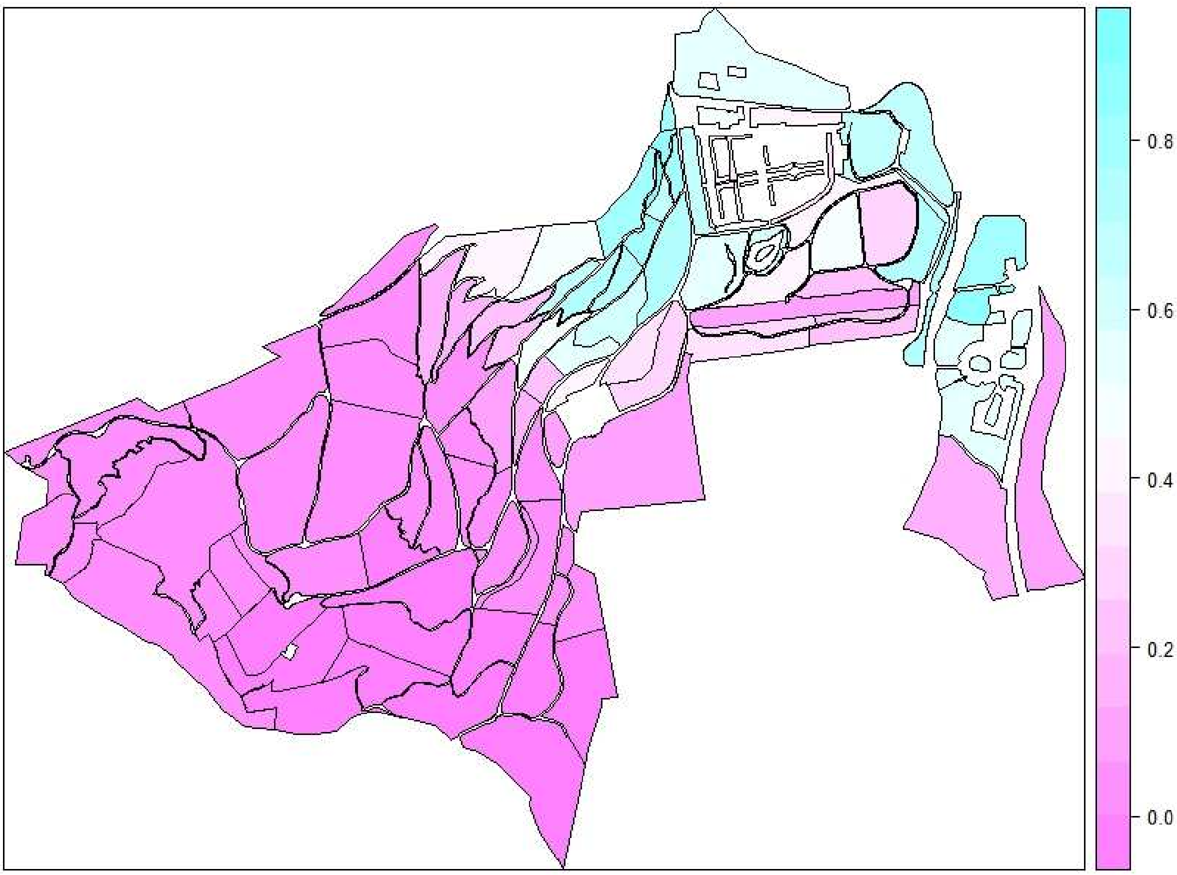
```
Fixed effects:
                    mean         sd        0.025quant    0.5quant      0.975quant    kld
(Intercept)      2.09076387 0.815772236  0.539533355  2.07303484  3.742617767 0.001776315
perc_hosts       0.01804778 0.008214225  0.002254191  0.01793081  0.034501035 0.001034849
prox_buildings  -0.01412324 0.005699696 -0.025687954 -0.01399254 -0.003296421 0.001157826
prox_water      -0.02763758 0.008235177 -0.044513482 -0.02738819 -0.012156102 0.003939343

Random effects:
Name       Model          Max KLD
nc.nb$ID   Besags ICAR model

Model hyperparameters:
                       mean     sd       0.025quant 0.5quant 0.975quant
```

```
Precision for nc.nb$ID 19910.50 19852.39   527.92   13784.20 73474.22

Expected number of effective parameters(std dev): 4.001(0.0002916)
Number of equivalent replicates : 6.999

Deviance Information Criterion: 103.20
Effective number of parameters: 3.899

Marginal Likelihood:  -153.96
```

To plot this data and produce a graphical representation:

```
BS$R1 <- h.model$summary.fitted.values[,1]
spplot(BS,"R1")
```

Output:



2. Spore trap model

The average level of *P. ramorum* inoculum (in picograms) over all spore traps at Benmore was modelled as follows:

A binomial GLM using the *glm* function in R was used. A matrix was created for the response variable based on the number of positive traps versus the total number of traps sampled (column 1=number positives, column 2 = number negatives) thus:

```
traps <- cbind(ramorum$t_m,(5-ramorum$t_m))
traps
```

Therefore the response variable was the proportion of traps that were positive for *P. ramorum* on a given sampling event.

The full model was:

```
model9 <- glm(traps ~ rain_avg+rain_sd+temp_avg+temp_sd+rh_avg+rh_sd
      +rain_avg_1+rain_sd_1+temp_avg_1+temp_sd_1+rh_avg_1+rh_sd_1+
      I(rain_avg^2)+rain_avg:temp_avg, data=ramorum, family=binomial)
```

Best model after backward selection:

```
model10k <- glm(traps ~ temp_avg+rh_sd+rh_avg_1+rain_avg+
      rain_avg:temp_avg, data=ramorum, family=binomial)
```

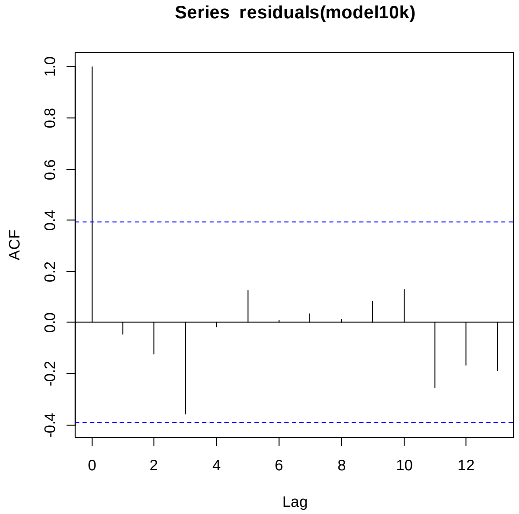
Output from model10k:

```
Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.1266  -0.9739  -0.2880   0.4041   3.7559

Coefficients:
                  Estimate Std. Error z value Pr(>|z|)
(Intercept)        5.17412    1.87784   2.755 0.005863 **
temp_avg          -0.34572    0.10266  -3.368 0.000759 ***
rh_sd             -0.06211    0.02925  -2.124 0.033710 *
rh_avg_1          -0.02819    0.01412  -1.996 0.045945 *
rain_avg          -0.40775    0.12506  -3.260 0.001112 **
temp_avg:rain_avg  0.04444    0.01407   3.157 0.001592 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 55.065  on 24  degrees of freedom
Residual deviance: 36.973  on 19  degrees of freedom
AIC: 78.129
```

Overall deviance explained ($\frac{null\ deviance - residual\ deviance}{null\ deviance}$) is 33%

Used runs.test to check for temporal autocorrelation in the model residuals, none was found:

```
> runs.test(residuals(model10k))

        Runs Test - Two sided

data:  residuals(model10k)
Standardized Runs Statistic = -1.8336, p-value = 0.06671

acf(residuals(model10k))
```



The *vif* function (Variance Inflation Factor) in R was used to check for collinearity between variables:

```
> vif(model10k)

temp_avg        rh_sd           rh_avg_1        rain_avg
1.173587        1.103097        1.676743        1.522470
```

The higher the number, the higher the collinearity with anything over 5 showing collinearity and 10 being considered as the cut-off. The variables included in this model show low collinearity.

3. Bait plant model

Initially a GLM was attempted but significant autocorrelation was discovered (using a runs test in R) so a GEEGLM was used (generalised linear model with a generalised estimating equation) using the *geeglm* function in R.

Full model:

```
model5 <- geeglm(infected~rh_avg+rh_avg_1+host+rain_std+rain_std_1,
data=ramorum, family=binomial, id=tblock)
```

Best model after backward selection:

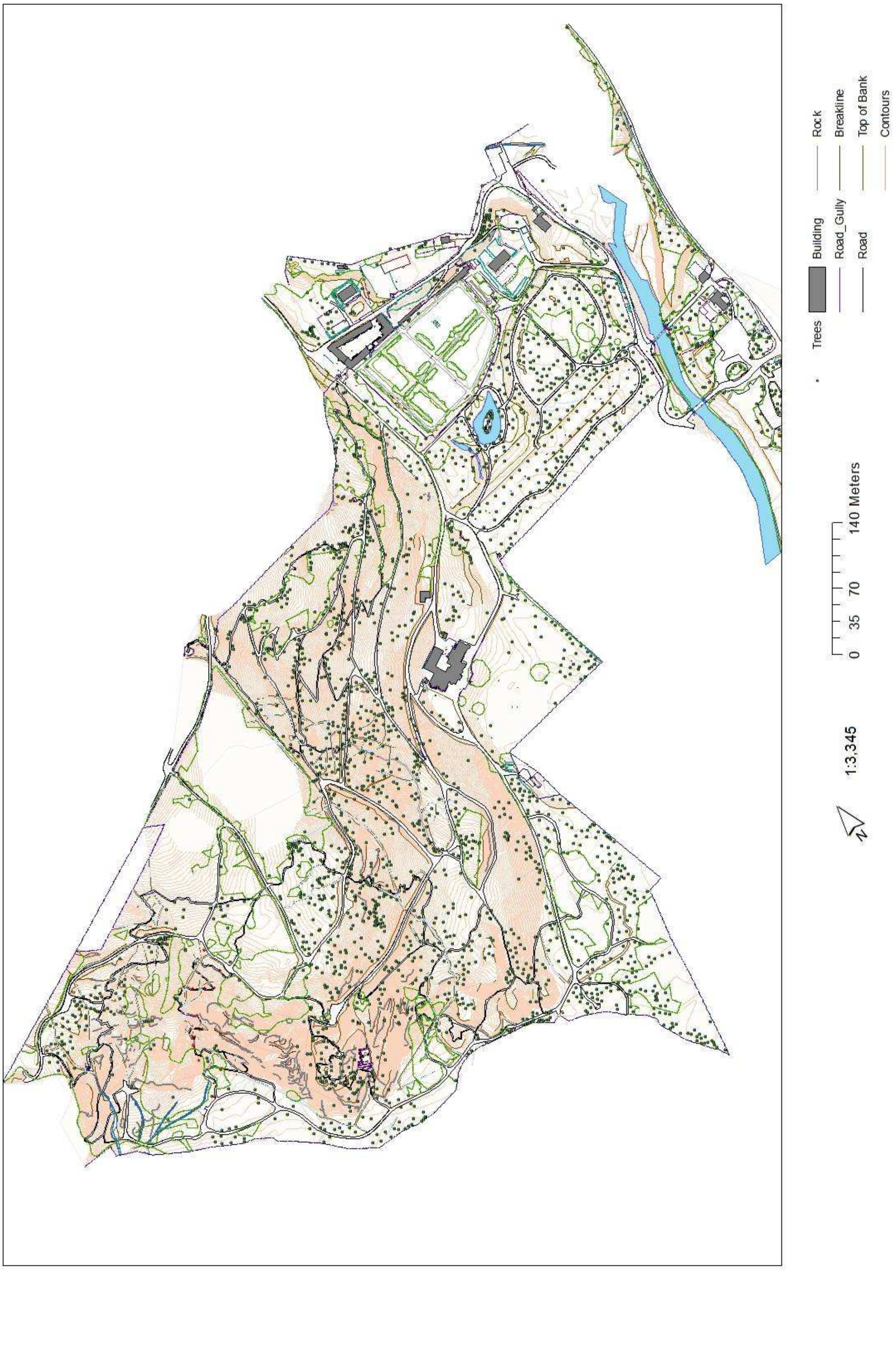
```
model5b <- geeglm(infected~rh_avg_1+host+rain_std, data=ramorum,
family=binomial, id=tblock)
```

Output from model 5:

```
Coefficients:
            Estimate Std.err  Wald Pr(>|W|)
(Intercept)  -5.3048  1.5592 11.57  0.00067 ***
rh_avg_1      0.0244  0.0160  2.32  0.12773
host1         2.3267  0.5634 17.06  3.6e-05 ***
rain_std      0.1957  0.0627  9.75  0.00180 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Estimated Scale Parameters:
            Estimate Std.err
(Intercept)    0.977   0.427

Correlation: Structure = independence Number of clusters:   50   Maximum
cluster size: 2
```

Appendix G

1. Map of Benmore provided by RBGE and created using ArcGIS 10 (ESRI, 2012).



2. Host plant data

Bed	No. plants in Bed	No. species in bed	No. Pk hosts in bed	% Pk hosts in bed	No. Pr hosts in bed	% Pr hosts in bed
YA1	86	53	41	47.6744186	49	56.97674419
YA2	91	59	23	25.27472527	27	29.67032967
YA3	44	12	26	59.09090909	31	70.45454545
YA4	67	36	30	44.7761194	45	67.1641791
YA8	90	65	34	37.77777778	44	48.88888889
YA9	49	36	8	16.32653061	9	18.36734694
YC1	64	32	31	48.4375	27	42.1875
YC2	103	66	47	45.63106796	44	42.7184466
YC3	52	30	2	3.846153846	4	7.692307692
YC4	186	94	49	26.34408602	54	29.03225806
YC5	34	14	18	52.94117647	18	52.94117647
YC6	35	8	3	8.571428571	0	0
YC7	39	21	1	2.564102564	5	12.82051282
YC8	87	69	4	4.597701149	4	4.597701149
YC9	83	18	10	12.04819277	10	12.04819277
YC10	37	16	17	45.94594595	18	48.64864865
YE1	17	14	5	29.41176471	6	35.29411765
YE2	40	27	32	80	29	72.5
YE3	106	50	43	40.56603774	48	45.28301887
YE4	68	37	35	51.47058824	35	51.47058824
YE5	100	45	22	22	31	31
YE6	115	47	17	14.7826087	9	7.826086957
YF1	90	34	44	48.88888889	49	54.44444444
YF2	38	19	20	52.63157895	21	55.26315789
YF3	105	41	83	79.04761905	83	79.04761905
YF4	69	41	42	60.86956522	42	60.86956522
YF5	56	15	19	33.92857143	19	33.92857143
YF6	124	53	9	7.258064516	11	8.870967742
YF7	323	99	36	11.14551084	49	15.17027864
YF8	146	56	3	2.054794521	12	8.219178082
YF9	51	36	17	33.33333333	16	31.37254902
YF10	75	48	0	0	0	0
YF11	27	20	0	0	0	0
YF12	13	10	0	0	0	0
YF13	34	24	0	0	0	0
YF14	12	10	0	0	0	0
YF15	78	23	16	20.51282051	16	20.51282051
YF16	118	40	0	0	0	0
YG1	46	22	39	84.7826087	38	82.60869565
YG2	131	48	97	74.04580153	109	83.20610687
YG3	138	73	57	41.30434783	64	46.37681159
YG4	114	52	22	19.29824561	23	20.1754386
YG5	101	29	1	0.99009901	6	5.940594059
YG7	77	25	58	75.32467532	66	85.71428571
YG8	177	53	33	18.6440678	46	25.98870056
YH1	37	17	27	72.97297297	27	72.97297297
YH2	75	35	64	85.33333333	65	86.66666667
YH3	37	19	26	70.27027027	26	70.27027027
YH4	54	26	42	77.77777778	47	87.03703704

YH5	115	45	42	36.52173913	44	38.26086957
YH6	121	36	58	47.9338843	59	48.76033058
YJ1	179	71	102	56.98324022	103	57.54189944
YJ2	98	55	67	68.36734694	67	68.36734694
YJ3	82	35	47	57.31707317	48	58.53658537
YJ4	160	73	80	50	85	53.125
YJ5	137	54	10	7.299270073	10	7.299270073
YJ6	45	24	27	60	27	60
YJ7	76	43	38	50	39	51.31578947
YJ8	32	15	4	12.5	4	12.5
YK1	19	16	9	47.36842105	10	52.63157895
YK2	33	22	18	54.54545455	18	54.54545455
YK3	41	27	16	39.02439024	16	39.02439024
YK4	31	17	23	74.19354839	23	74.19354839
YK5	35	15	6	17.14285714	6	17.14285714
YK6	79	18	66	83.5443038	65	82.27848101
YK7	147	54	99	67.34693878	103	70.06802721
YK8	96	30	73	76.04166667	76	79.16666667
YK9	124	27	101	81.4516129	102	82.25806452
YL1	142	30	111	78.16901408	114	80.28169014
YL2	124	47	67	54.03225806	83	66.93548387
YL3	64	31	34	53.125	46	71.875
YL4	101	31	81	80.1980198	83	82.17821782
YL5	22	9	11	50	11	50
YL6	42	17	34	80.95238095	34	80.95238095
YL7	28	16	10	35.71428571	13	46.42857143
YL8	90	35	43	47.77777778	47	52.22222222
YL9	96	49	44	45.83333333	56	58.33333333
YM1	96	43	18	18.75	24	25
YN1	109	58	39	35.77981651	42	38.53211009
YN2	86	45	24	27.90697674	30	34.88372093
YN3	66	27	34	51.51515152	37	56.06060606
YN4	91	37	49	53.84615385	51	56.04395604
YN5	40	1	40	100	0	0
YP1	52	30	9	17.30769231	9	17.30769231
YP2	117	77	17	14.52991453	17	14.52991453
YP3	221	120	66	29.86425339	73	33.03167421
YP5	79	58	18	22.78481013	18	22.78481013
YP6	74	36	45	60.81081081	46	62.16216216
YQ1	67	42	25	37.31343284	26	38.80597015
YQ2	8	2	0	0	0	0
YQ3	13	4	0	0	0	0
YQ4	59	45	0	0	0	0
YQ5	67	52	1	1.492537313	1	1.492537313
YQ6	31	14	6	19.35483871	6	19.35483871
YQ7	31	9	1	3.225806452	1	3.225806452
YQ8	22	7	4	18.18181818	4	18.18181818
YQ9	27	7	7	25.92592593	7	25.92592593
YR1	10	9	1	10	1	10
YR2	12	9	0	0	0	0
YR3	45	27	3	6.666666667	3	6.666666667
YR4	75	47	15	20	14	18.66666667

YR5	30	11	6	20	6	20
YR6	47	20	6	12.76595745	6	12.76595745
YR7	48	20	5	10.41666667	5	10.41666667
YR8	55	19	4	7.272727273	4	7.272727273
YS1	182	53	7	3.846153846	34	18.68131868
YS2	64	21	9	14.0625	24	37.5
YS3	220	69	14	6.363636364	17	7.727272727
YS4	377	98	35	9.283819629	53	14.05835544
YS5	54	13	11	20.37037037	11	20.37037037
YS6	80	18	0	0	0	0
YS7	174	46	44	25.28735632	44	25.28735632
YS8	176	54	36	20.45454545	36	20.45454545
YS9	149	43	16	10.73825503	19	12.75167785
YT1	43	19	5	11.62790698	8	18.60465116
YT2	113	32	2	1.769911504	2	1.769911504
YT3	52	9	0	0	0	0
YT4	52	18	10	19.23076923	10	19.23076923
YU1	126	25	1	0.793650794	10	7.936507937
YU2	163	36	1	0.613496933	11	6.748466258
YU3	51	18	0	0	0	0
YU4	351	38	0	0	2	0.56980057
YU5	403	39	3	0.744416873	9	2.23325062
YU6	208	9	0	0	0	0
YY0	897	261	139	15.4960981	157	17.50278707

Appendix H

1. Photographs of the study sites at Brodick:

Site 1:

Above: site 1 was on a slope down to a path (closed to public) containing partially cleared *R. ponticum* which was re-growing.

Below: The low level trap at site 1 placed close to infected *R. ponticum* regrowth.

Brodick sites 2 and 3:

Site 2 was within an area dominated by *R. ponticum* in the lower part of the garden just above a path (closed to the public). The white funnel from the high level trap can be seen in the centre of the photograph.

Site 3 was within an area planted with an unknown species of *Rhododendron* in the lower part of the garden. A low level trap was also situated here. This site is c.4 meters from the very large infected *Drimys* that was removed before the study started.

Brodick Sites 4 and 5a:

Above: The spore traps at site 4 can be seen in the centre of this photograph. This area once contained a substantial area of *Rhododendron* species including *R. ponticum* which were partially removed but were re-growing in some cases. The area is at sea level and floods regularly.
Below: Site 5a was the original site 5 before a more extensive infection was found on the other side of the path to the left in the photograph below. The plants infected here was *Pieris japonica*.

Brodick site 5b:

Above: site 5b was set up under the large mature group of *Pieris* to the left of the photograph. The trees look healthy but the investigations here found them to be infected with *P. kernoviae*. Site 5a can be seen to the right of the photograph.

Below: The high and low level traps under the canopy of the *Pieris* trees at site 5b.

Brodick Site 6 and Merkland Wood:

Site 6 was set up under this *Drimys winteri* (pictured) which had been infected with *P. kernoviae*. The tree had been removed before the study started but some infected regrowth was evident. This was in the lower part of the garden c. 4 meters from site 3.

The Merkland Wood site was about 1km from Brodick Garden. It was among a *Vaccinium myrtillus* infection in a mature beech forest. This was the only confirmed infection on a heathland species in Scotland and therefore an important site for assessing the potential impact of *P. kernoviae* on Scottish heathlands.

2. Photographs of the study sites at Benmore:

Site 1:

Above: Site 1 from above showing the extent of the area where the infected *Rhododendron* 'Elizabeth hobbie' was cleared. The low level trap, the small stream and the numerous *Rhododendron* cultivars can also be seen.
Below: Site 1 from the path below it.

Benmore site 2:

The *P. ramorum* infected *Magnolia kobus* during spring. The high and low level traps can be seen under the canopy

The high level rain trap under the *M. kobus* during the summer potentially catching spores from the surrounding leaves during periods of rain

Benmore sites 3 & 4:

Above: The arrow shows the low level trap at site 3. This was where a *P. ramorum* infected *Kalmia latifolia* once stood. This site was about 10 metres from site 2 and there was another (uninfected) large *Magnolia* to the left of the picture.

Below: Site 4 was close to one of the main paths into the garden and was where two infected *Osmanthus* shrubs were removed in June 2009. The low level trap can be seen close to where one one of the shrubs was removed. This site was very close to the *Sequioadendron* avenue which is on the other side of the path shown at the bottom of the picture.

Appendix I

1. Raw data showing the incidence of *P. ramorum* inoculum in spore traps at Benmore (picograms/µl):

	Site 1 L/L	Site 2 H/L	Site 2 L/L	Site 3 L/L	Site 4 L/L
Feb-10	0	2.02	0	0.962	1.92
Mar-10	3.5	0	0	2.17	2.25
Apr-10	6.04	3.21	2.44	2.02	2.86
May-10	0	0	0	0	0
Jun-10	0	0	0	0	0
Jul-10	0	0	0	0	0
Aug-10	0	0	0	10.64	0
Sep-10	3.72	0	0	6.09	5.22
Oct-10	0	0	0	0	2.52
Nov-10	0	0	0	0	0
Dec-10	0	1.21	2.05	0	7.59
Jan-11	0	0	0	0	0
Feb-11	0	0	0	1.72	0
Mar-11	0	0	0	0	0
Apr-11	0	0	5.42	0	0
May-11	0	0	0	0	0
Jun-11	9.17	0	0	6.32	1.36
Jul-11	3.682	0	0	0	3.338
Aug-11	0	0	0	0	0
Sep-11	0	0	0	0	0
Oct-11	0	0	9.26	0	0
Nov-11	0	5.98	1.329	0	0
Dec-11	2.91	0	5	0	0
Jan-12	0	0	0	0	2.61
Feb-12	0	0	18.33	0	0

2. The incidence of *P. kernoviae* inoculum in spore traps at Benmore (picograms/µl):

	Site 2 H/L	Site 2 L/L	Site 4 L/L	Site 1 L/L	Site 3 L/L
Feb-10	1.366	0	0	1.12	2.13
Mar-10	0	0	0	0	0
Apr-10	0	0	0	0	0
May-10	0	0	0	0	0
Jun-10	0	0	0	0	0
Jul-10	0	0	0	0	0
Aug-10	0	0	0	0	0
Sep-10	0	0	0	0	0
Oct-10	0	0	1.96	0	0
Nov-10	0	0	0	0	0
Dec-10	0	0	0	0	0
Jan-11	0	0	0	0	0
Feb-11	0	0	0	0	0
Mar-11	0	0	0	0	0
Apr-11	0	0	0	0	0
May-11	0	0	0	0	0
Jun-11	0	0	0	0	0
Jul-11	0	0	0	0	0
Aug-11	0	0	0	0	0
Sep-11	0	0	0	0	0
Oct-11	0	0	0	0	0
Nov-11	0	0	0	0	0
Dec-11	0	0	0	0	0
Jan-12	0	0	0	0	0
Feb-12	0	0	0	0	0

3. The incidence of *P. kernoviae* inoculum in spore traps at Brodick (picograms/µl):

	Site 1 LL	Site 1 HL	Site 2	Site 3 LL	Site 3 HL	Site 4 LL	Site 4 HL	Site 5 LL	Site 5 HL	Site 6	Merkland Wood
Feb 10	0	0	0	0	0	0	0	0	0	0	0
Mar 10	0	0	0	164.5	0	0	65	0	0	0	0
Apr 10	0	0	0	0	0	0	0	0	0	0	0
May 10	0	0	0	0	0	0	0	0	0	0	0
June 10	0	0	0	0	0	0	0	0	0	0	0
July 10	0	0	0	0	0	0	0	0	0	0	0
Aug 10	0	0	0	0	0	0	0	0	0	0	0
Sept 10	0	0	0	0	0	0	0	0	0	0	0
Oct 10	0	0	0	0	0	0	0	151.5	0	0	0
Nov 10	0	0	0	0	0	0	0	0	0	0	0
Dec 10	0	0	0	0	0	0	0	1520	0	0	0
Jan 11	0	0	0	0	0	0	0	985	0	0	0
Feb 11	0	0	0	0	0	0	0	466.8	0	0	0
Mar 11	0	0	0	0	0	0	0	305	0	0	0
Apr 11	0	0	0	0	0	0	0	884	0	0	0
May 11	0	0	0	0	0	0	0	275	0	0	0
June 11	0	0	0	0	0	0	0	0	0	0	0
July 11	0	0	0	0	0	0	0	0	0	0	0
Aug 11	0	0	0	0	0	0	0	0	91.8	0	0
Sept 11	0	0	0	0	0	0	0	0	330.65	0	0
Oct 11	0	0	0	0	0	0	0	303	344.15	0	0
Nov 11	0	0	0	0	0	0	0	0	0	0	0
Dec 11	0	0	0	0	0	0	0	0	0	0	0
Jan 12	0	0	0	0	0	0	0	93	0	0	0
Feb 12	0	0	0	0	0	0	0	0	0	0	0

4. The incidence of *P. ramorum* bait plant infection at Benmore:

	Site 1	Site 2	Site 3	Site 4
Feb-10				
Mar-10				
Apr-10			Positive	Positive
May-10				
Jun-10				
Jul-10		Positive		Positive
Aug-10		Positive		Positive
Sep-10		Positive		Positive
Oct-10		Positive		Positive
Nov-10		Positive		
Dec-10				
Jan-11		Positive		Positive
Feb-11		Positive		Positive
Mar-11		Positive		Positive
Apr-11		Positive	Positive	Positive
May-11		Positive		
Jun-11		Positive		
Jul-11				
Aug-11		Positive	Positive	Positive
Sep-11		Positive		
Oct-11		Positive		Positive
Nov-11				
Dec-11		Positive		Positive
Jan-12		Positive	Positive	Positive
Feb-12				Positive

5. The incidence of *P. kernoviae* bait plant infection at Brodick:

	Site 1	Site 2	Site 3	Site 4	Site 5	Merkland
Feb-10						
Mar-10						
Apr-10						
May-10						
Jun-10						
Jul-10						
Aug-10						
Sep-10						
Oct-10						
Nov-10						
Dec-10						
Jan-11						
Feb-11					Positive	
Mar-11					Positive	
Apr-11					Positive	
May-11						
Jun-11					Positive	
Jul-11				Positive	Positive	
Aug-11				Positive	Positive	
Sep-11						
Oct-11				Positive	Positive	
Nov-11					Positive	
Dec-11				Positive	Positive	
Jan-12				Positive	Positive	
Feb-12					Positive	

6. The incidence of *P. ramorum* inoculum in soil at Benmore (Picograms/ml):

	Site 2	Site 1	Site 3	Site 4
Feb 10	200.5	175	0	115
May 10	5000	105	0	1160
Aug 10	11205	0	0	130
Nov 10	325	251.5	190	4010.5
Feb 11	1718	0	122	145
May 11	1501	179	0	188
Aug 11	15805	120	0	492
Nov 11	836	0	0	218
Feb 12	5645	155.5	697	3706

7. The incidence of *P. kernoviae* inoculum in soil at Benmore (Picograms/ml):

	Site 1	Site 2	Site 3	Site 4
Feb 10	0	0	0	0
May 10	559.5	0	0	0
Aug 10	0	0	0	0
Nov 10	143.5	0	0	0
Feb 11	191	0	0	0
May 11	73	0	0	0
Aug 11	190	0	0	0
Nov 11	0	0	0	0
Feb 12	74	0	0	0

8. The incidence of *P. kernoviae* inoculum in soil at Brodick (Picograms/ml):

	Site 1	Site 2	Site 3	Site 4	Site 5a	Site 5b	Merkland	Site 6
Feb 10	263	204.5	293	382.5	0	0	66	0
May 10	0	0	0	0	99	2347.5	99	0
Aug 10	317	56	266.5	582	69	2826.5	61	956.5
Nov 10	645	255.5	615	114	166.5	1795	216	1070
Feb 11	279.5	616.5	1042.5	885	182	2816.5	79.5	1334.5
May 11	229.5	293	916	567.5	214.5	2740.5	116.5	1253
Aug 11	554.5	300.5	796	603	155.5	2743	109	1173.5
Nov 11	439	1710.5	705.5	637.5	420	4380	67	1466
Feb 12	494	821	644.5	555	320	3566.5	107.5	1369.5

Appendix J

Raw data used for the modelling

1. Spore trap model

av_pg	max_pg	sd_pg	t_m	year	event	month	Rain_avg	rain_sd	rain_total	rain_avg_1	rain_sd_1	rain_total_1	Temp_avg	Temp_sd	temp_avg_1	temp_sd_1	rh_avg	rh_sd	rh_avg_1	rh_sd_1
0.9804	2.02	0.985688	3	1	1	2	4.8	11.5	199.5	4.7	10.7	146.6	1.8	2.1	0.1	2.7	56	33.2	31.1	34.6
1.584	3.5	1.539165	3	1	2	3	4.4	6.3	129	4.8	11.5	199.5	5	2.5	1.8	2.1	92.2	6.3	56	33.2
4.308	11.01	3.773045	5	1	3	4	5.7	11.4	160.3	4.4	6.3	129	7.9	1.9	5	2.5	84.4	10.5	92.2	6.3
0	0	0	0	1	4	5	1.3	2.2	37.1	5.7	11.4	160.3	10.8	3.1	7.9	1.9	81	13.5	84.4	10.5
0	0	0	0	1	5	6	1.9	4	71.8	1.3	2.2	37.1	14.3	2.5	10.8	3.1	80	9.9	81	13.5
0	0	0	0	1	6	7	8.1	9.7	210.2	1.9	4	71.8	14.3	1	14.3	2.5	93.3	6.1	80	9.9
2.128	10.64	4.758353	1	1	7	8	5.4	7.9	150.4	8.1	9.7	210.2	14.1	1.1	14.3	1	91.5	6.9	93.3	6.1
3.006	6.09	2.872052	3	1	8	9	8.8	11.3	254.9	5.4	7.9	150.4	12.9	1.4	14.1	1.1	92.5	8.4	91.5	6.9
0.504	2.52	1.126978	1	1	9	10	8.5	10.9	296.8	8.8	11.3	254.9	8.8	2.7	12.9	1.4	94.4	12.5	92.5	8.4
0	0	0	0	1	10	11	12.6	16.1	328.2	8.5	10.9	296.8	5.3	2.7	8.8	2.7	88.3	29.3	94.4	12.5
2.17	7.59	3.151595	3	1	11	12	2.4	3.9	64.6	12.6	16.1	328.2	-1.3	3	5.3	2.7	93.1	20.1	88.3	29.3
0	0	0	0	1	12	1	7.9	10.6	237.3	2.4	3.9	64.6	1.4	4.2	-1.3	3	78.7	36.5	93.1	20.1
0.344	1.72	0.769207	1	2	13	2	10.4	12.1	281.6	7.9	10.6	237.3	3.3	2.2	1.4	4.2	99.8	0.5	78.7	36.5
0	0	0	0	2	14	3	7.7	9.6	222.5	10.4	12.1	281.6	4.4	2	3.3	2.2	99.4	1.3	99.8	0.5
1.084	5.42	2.423898	1	2	15	4	6.5	10.4	183	7.7	9.6	222.5	8.1	2.7	4.4	2	93.4	5.4	99.4	1.3
0	0	0	0	2	16	5	3.7	8.3	104.6	6.5	10.4	183	11.3	1.7	8.1	2.7	81.3	14.9	93.4	5.4
3.37	9.17	4.156212	3	2	17	6	10.8	11.3	301.4	3.7	8.3	104.6	10.1	1.9	11.3	1.7	94.8	6.4	81.3	14.9
1.404	3.682	1.926349	2	2	18	7	4.9	6.8	131.8	10.8	11.3	301.4	12.3	1.7	10.1	1.9	90.4	9	94.8	6.4
0	0	0	0	2	19	8	3.6	6.2	85.9	4.9	6.8	131.8	14.7	1.1	12.3	1.7	73.7	24.1	90.4	9
0	0	0	0	2	20	9	8.8	14	228.4	3.6	6.2	85.9	12.9	1.2	14.7	1.1	82.3	24.8	73.7	24.1

1.852	9.26	4.141198	1	2	21	10	14.5	12.9	334	8.8	14	228.4	12.1	1.3	12.9	1.2	60.2	26.5	82.3	24.8
1.4618	5.98	2.59048	2	2	22	11	10.9	10.1	304.5	14.5	12.9	334	10.8	3	12.1	1.3	58.3	25.31	60.2	26.5
1.582	2.91	2.288803	1	2	23	12	16.1	18.5	465.9	10.9	10.1	304.5	8.8	2.3	10.8	3	19.8	9.8	58.3	25.31
0.522	2.61	1.167227	1	2	24	1	17	11.9	306	16.1	18.5	465.9	2.5	1.6	8.8	2.3	21.4	11.6	19.8	9.8
3.666	18.33	8.197425	1	3	25	2	22.3	11.3	312.6	17	11.9	306	5.7	2.7	2.5	1.6	9.2	9.3	21.4	11.6

2. Bait plant model:

Month Collected	**infected**	**site**	**host**	**year**	**month**	**tblock**	**event**	**Rain _avg**	**Rain _std**	**Rain _total**	**rain_ avg_ 1**	**rain_ std_1**	**rain_ total_ 1**	**Temp _avg**	**Temp _std**	**temp _avg _1**	**temp _std_ 1**	**rh_ avg**	**rh_ avg_ 1**	**rh_ sd**
Feb-10	0	2	1	1	2	1	1	4.8	11.5	199.5	6.3	12.8	132.5	1.8	2.1	0.1	2.7	56	31.1	34.6
Mar-10	0	2	1	1	3	1	2	4.4	6.3	129	4.8	11.5	199.5	5	2.5	1.8	2.1	92.2	56	33.2
Apr-10	0	2	1	1	4	2	3	5.7	11.4	160.3	4.4	6.3	129	7.9	1.9	5	2.5	84.4	92.2	6.3
May-10	0	2	1	1	5	2	4	1.3	2.2	37.1	5.7	11.4	160.3	10.8	3.1	7.9	1.9	81	84.4	10.5
Jun-10	0	2	1	1	6	3	5	1.9	4	71.8	1.3	2.2	37.1	14.3	2.5	10.8	3.1	80	81	13.5
Jul-10	1	2	1	1	7	3	6	8.1	9.7	210.2	1.9	4	71.8	14.3	1	14.3	2.5	93.3	80	9.9
Aug-10	1	2	1	1	8	4	7	5.4	7.9	150.4	8.1	9.7	210.2	14.1	1.1	14.3	1	91.5	93.3	6.1
Sep-10	1	2	1	1	9	4	8	8.8	11.3	254.9	5.4	7.9	150.4	12.9	1.4	14.1	1.1	92.5	91.5	6.9
Oct-10	1	2	1	1	10	5	9	8.5	10.9	296.8	8.8	11.3	254.9	8.8	2.7	12.9	1.4	94.4	92.5	8.4
Nov-10	1	2	1	1	11	5	10	12.6	16.1	328.2	8.5	10.9	296.8	5.3	2.7	8.8	2.7	88.3	94.4	12.5
Dec-10	0	2	1	1	12	6	11	2.4	3.9	64.6	12.6	16.1	328.2	-1.3	3	5.3	2.7	93.1	88.3	29.3
Jan-11	1	2	1	1	1	6	12	7.9	10.6	237.3	2.4	3.9	64.6	1.4	4.2	-1.3	3	78.7	93.1	20.1
Feb-11	1	2	1	2	2	7	13	10.4	12.1	281.6	7.9	10.6	237.3	3.3	2.2	1.4	4.2	99.8	78.7	36.5
Mar-11	1	2	1	2	3	7	14	7.7	9.6	222.5	10.4	12.1	281.6	4.4	2	3.3	2.2	99.4	99.8	0.5
Apr-11	1	2	1	2	4	8	15	6.5	10.4	183	7.7	9.6	222.5	8.1	2.7	4.4	2	93.4	99.4	1.3
May-11	1	2	1	2	5	8	16	3.7	8.3	104.6	6.5	10.4	183	11.3	1.7	8.1	2.7	81.3	93.4	5.4
Jun-11	1	2	1	2	6	9	17	10.8	11.3	301.4	3.7	8.3	104.6	10.1	1.9	11.3	1.7	94.8	81.3	14.9
Jul-11	0	2	1	2	7	9	18	4.9	6.8	131.8	10.8	11.3	301.4	12.3	1.7	10.1	1.9	90.4	94.8	6.4
Aug-11	1	2	1	2	8	10	19	3.6	6.2	85.9	4.9	6.8	131.8	14.7	1.1	12.3	1.7	73.7	90.4	9
Sep-11	1	2	1	2	9	10	20	8.8	14	228.4	3.6	6.2	85.9	12.9	1.2	14.7	1.1	82.3	73.7	24.1
Oct-11	1	2	1	2	10	11	21	14.5	12.9	334	8.8	14	228.4	12.1	1.3	12.9	1.2	60.2	82.3	24.8
Nov-11	0	2	1	2	11	11	22	10.9	10.1	304.5	14.5	12.9	334	10.8	3	12.1	1.3	58.3	60.2	26.5
Dec-11	1	2	1	2	12	12	23	16.1	18.5	465.9	10.9	10.1	304.5	8.8	2.3	10.8	3	19.8	58.3	25.31
Jan-12	1	2	1	2	1	12	24	17	11.9	306	16.1	18.5	465.9	2.5	1.6	8.8	2.3	21.4	19.8	9.8
Feb-12	1	2	1	3	2	13	25	22.3	11.3	312.6	17	11.9	306	5.7	2.7	2.5	1.6	9.2	21.4	9.3
Feb-10	0	4	0	1	2	1	1	4.8	11.5	199.5	6.3	12.8	132.5	1.8	2.1	0.1	2.7	56	31.1	34.6
Mar-10	0	4	0	1	3	1	2	4.4	6.3	129	4.8	11.5	199.5	5	2.5	1.8	2.1	92.2	56	33.2
Apr-10	1	4	0	1	4	2	3	5.7	11.4	160.3	4.4	6.3	129	7.9	1.9	5	2.5	84.4	92.2	6.3

May-10	0	4	0	1	5	2	4	1.3	2.2	37.1	5.7	11.4	160.3	10.8	3.1	7.9	1.9	81	84.4	10.5
Jun-10	0	4	0	1	6	3	5	1.9	4	71.8	1.3	2.2	37.1	14.3	2.5	10.8	3.1	80	81	13.5
Jul-10	1	4	0	1	7	3	6	8.1	9.7	210.2	1.9	4	71.8	14.3	1	14.3	2.5	93.3	80	9.9
Aug-10	1	4	0	1	8	4	7	5.4	7.9	150.4	8.1	9.7	210.2	14.1	1.1	14.3	1	91.5	93.3	6.1
Sep-10	1	4	0	1	9	4	8	8.8	11.3	254.9	5.4	7.9	150.4	12.9	1.4	14.1	1.1	92.5	91.5	6.9
Oct-10	1	4	0	1	10	5	9	8.5	10.9	296.8	8.8	11.3	254.9	8.8	2.7	12.9	1.4	94.4	92.5	8.4
Nov-10	0	4	0	1	11	5	10	12.6	16.1	328.2	8.5	10.9	296.8	5.3	2.7	8.8	2.7	88.3	94.4	12.5
Dec-10	0	4	0	1	12	6	11	2.4	3.9	64.6	12.6	16.1	328.2	-1.3	3	5.3	2.7	93.1	88.3	29.3
Jan-11	1	4	0	1	1	6	12	7.9	10.6	237.3	2.4	3.9	64.6	1.4	4.2	-1.3	3	78.7	93.1	20.1
Feb-11	1	4	0	2	2	7	13	10.4	12.1	281.6	7.9	10.6	237.3	3.3	2.2	1.4	4.2	99.8	78.7	36.5
Mar-11	1	4	0	2	3	7	14	7.7	9.6	222.5	10.4	12.1	281.6	4.4	2	3.3	2.2	99.4	99.8	0.5
Apr-11	1	4	0	2	4	8	15	6.5	10.4	183	7.7	9.6	222.5	8.1	2.7	4.4	2	93.4	99.4	1.3
May-11	0	4	0	2	5	8	16	3.7	8.3	104.6	6.5	10.4	183	11.3	1.7	8.1	2.7	81.3	93.4	5.4
Jun-11	0	4	0	2	6	9	17	10.8	11.3	301.4	3.7	8.3	104.6	10.1	1.9	11.3	1.7	94.8	81.3	14.9
Jul-11	0	4	0	2	7	9	18	4.9	6.8	131.8	10.8	11.3	301.4	12.3	1.7	10.1	1.9	90.4	94.8	6.4
Aug-11	1	4	0	2	8	10	19	3.6	6.2	85.9	4.9	6.8	131.8	14.7	1.1	12.3	1.7	73.7	90.4	9
Sep-11	0	4	0	2	9	10	20	8.8	14	228.4	3.6	6.2	85.9	12.9	1.2	14.7	1.1	82.3	73.7	24.1
Oct-11	1	4	0	2	10	11	21	14.5	12.9	334	8.8	14	228.4	12.1	1.3	12.9	1.2	60.2	82.3	24.8
Nov-11	0	4	0	2	11	11	22	10.9	10.1	304.5	14.5	12.9	334	10.8	3	12.1	1.3	58.3	60.2	26.5
Dec-11	1	4	0	2	12	12	23	16.1	18.5	465.9	10.9	10.1	304.5	8.8	2.3	10.8	3	19.8	58.3	25.31
Jan-12	1	4	0	2	1	12	24	17	11.9	306	16.1	18.5	465.9	2.5	1.6	8.8	2.3	21.4	19.8	9.8
Feb-12	0	4	0	3	2	13	25	22.3	11.3	312.6	17	11.9	306	5.7	2.7	2.5	1.6	9.2	21.4	9.3
Feb-10	0	3	0	1	2	1	1	4.8	11.5	199.5	6.3	12.8	132.5	1.8	2.1	0.1	2.7	56	31.1	34.6
Mar-10	0	3	0	1	3	1	2	4.4	6.3	129	4.8	11.5	199.5	5	2.5	1.8	2.1	92.2	56	33.2
Apr-10	1	3	0	1	4	2	3	5.7	11.4	160.3	4.4	6.3	129	7.9	1.9	5	2.5	84.4	92.2	6.3
May-10	0	3	0	1	5	2	4	1.3	2.2	37.1	5.7	11.4	160.3	10.8	3.1	7.9	1.9	81	84.4	10.5
Jun-10	0	3	0	1	6	3	5	1.9	4	71.8	1.3	2.2	37.1	14.3	2.5	10.8	3.1	80	81	13.5
Jul-10	0	3	0	1	7	3	6	8.1	9.7	210.2	1.9	4	71.8	14.3	1	14.3	2.5	93.3	80	9.9
Aug-10	0	3	0	1	8	4	7	5.4	7.9	150.4	8.1	9.7	210.2	14.1	1.1	14.3	1	91.5	93.3	6.1
Sep-10	0	3	0	1	9	4	8	8.8	11.3	254.9	5.4	7.9	150.4	12.9	1.4	14.1	1.1	92.5	91.5	6.9
Oct-10	0	3	0	1	10	5	9	8.5	10.9	296.8	8.8	11.3	254.9	8.8	2.7	12.9	1.4	94.4	92.5	8.4
Nov-10	0	3	0	1	11	5	10	12.6	16.1	328.2	8.5	10.9	296.8	5.3	2.7	8.8	2.7	88.3	94.4	12.5
Dec-10	0	3	0	1	12	6	11	2.4	3.9	64.6	12.6	16.1	328.2	-1.3	3	5.3	2.7	93.1	88.3	29.3
Jan-11	0	3	0	1	1	6	12	7.9	10.6	237.3	2.4	3.9	64.6	1.4	4.2	-1.3	3	78.7	93.1	20.1
Feb-11	0	3	0	2	2	7	13	10.4	12.1	281.6	7.9	10.6	237.3	3.3	2.2	1.4	4.2	99.8	78.7	36.5
Mar-11	0	3	0	2	3	7	14	7.7	9.6	222.5	10.4	12.1	281.6	4.4	2	3.3	2.2	99.4	99.8	0.5
Apr-11	1	3	0	2	4	8	15	6.5	10.4	183	7.7	9.6	222.5	8.1	2.7	4.4	2	93.4	99.4	1.3
May-11	0	3	0	2	5	8	16	3.7	8.3	104.6	6.5	10.4	183	11.3	1.7	8.1	2.7	81.3	93.4	5.4
Jun-11	0	3	0	2	6	9	17	10.8	11.3	301.4	3.7	8.3	104.6	10.1	1.9	11.3	1.7	94.8	81.3	14.9
Jul-11	0	3	0	2	7	9	18	4.9	6.8	131.8	10.8	11.3	301.4	12.3	1.7	10.1	1.9	90.4	94.8	6.4
Aug-11	1	3	0	2	8	10	19	3.6	6.2	85.9	4.9	6.8	131.8	14.7	1.1	12.3	1.7	73.7	90.4	9
Sep-11	0	3	0	2	9	10	20	8.8	14	228.4	3.6	6.2	85.9	12.9	1.2	14.7	1.1	82.3	73.7	24.1
Oct-11	0	3	0	2	10	11	21	14.5	12.9	334	8.8	14	228.4	12.1	1.3	12.9	1.2	60.2	82.3	24.8
Nov-11	0	3	0	2	11	11	22	10.9	10.1	304.5	14.5	12.9	334	10.8	3	12.1	1.3	58.3	60.2	26.5
Dec-11	0	3	0	2	12	12	23	16.1	18.5	465.9	10.9	10.1	304.5	8.8	2.3	10.8	3	19.8	58.3	25.31
Jan-12	0	3	0	2	1	12	24	17	11.9	306	16.1	18.5	465.9	2.5	1.6	8.8	2.3	21.4	19.8	9.8

Feb-12	0	3	0	3	2	13	25	22.3	11.3	312.6	17	11.9	306	5.7	2.7	2.5	1.6	9.2	21.4	9.3
Feb-10	0	1	0	1	2	1	1	4.8	11.5	199.5	6.3	12.8	132.5	1.8	2.1	0.1	2.7	56	31.1	34.6
Mar-10	0	1	0	1	3	1	2	4.4	6.3	129	4.8	11.5	199.5	5	2.5	1.8	2.1	92.2	56	33.2
Apr-10	0	1	0	1	4	2	3	5.7	11.4	160.3	4.4	6.3	129	7.9	1.9	5	2.5	84.4	92.2	6.3
May-10	0	1	0	1	5	2	4	1.3	2.2	37.1	5.7	11.4	160.3	10.8	3.1	7.9	1.9	81	84.4	10.5
Jun-10	0	1	0	1	6	3	5	1.9	4	71.8	1.3	2.2	37.1	14.3	2.5	10.8	3.1	80	81	13.5
Jul-10	0	1	0	1	7	3	6	8.1	9.7	210.2	1.9	4	71.8	14.3	1	14.3	2.5	93.3	80	9.9
Aug-10	0	1	0	1	8	4	7	5.4	7.9	150.4	8.1	9.7	210.2	14.1	1.1	14.3	1	91.5	93.3	6.1
Sep-10	0	1	0	1	9	4	8	8.8	11.3	254.9	5.4	7.9	150.4	12.9	1.4	14.1	1.1	92.5	91.5	6.9
Oct-10	0	1	0	1	10	5	9	8.5	10.9	296.8	8.8	11.3	254.9	8.8	2.7	12.9	1.4	94.4	92.5	8.4
Nov-10	0	1	0	1	11	5	10	12.6	16.1	328.2	8.5	10.9	296.8	5.3	2.7	8.8	2.7	88.3	94.4	12.5
Dec-10	0	1	0	1	12	6	11	2.4	3.9	64.6	12.6	16.1	328.2	-1.3	3	5.3	2.7	93.1	88.3	29.3
Jan-11	0	1	0	1	1	6	12	7.9	10.6	237.3	2.4	3.9	64.6	1.4	4.2	-1.3	3	78.7	93.1	20.1
Feb-11	0	1	0	2	2	7	13	10.4	12.1	281.6	7.9	10.6	237.3	3.3	2.2	1.4	4.2	99.8	78.7	36.5
Mar-11	0	1	0	2	3	7	14	7.7	9.6	222.5	10.4	12.1	281.6	4.4	2	3.3	2.2	99.4	99.8	0.5
Apr-11	0	1	0	2	4	8	15	6.5	10.4	183	7.7	9.6	222.5	8.1	2.7	4.4	2	93.4	99.4	1.3
May-11	0	1	0	2	5	8	16	3.7	8.3	104.6	6.5	10.4	183	11.3	1.7	8.1	2.7	81.3	93.4	5.4
Jun-11	0	1	0	2	6	9	17	10.8	11.3	301.4	3.7	8.3	104.6	10.1	1.9	11.3	1.7	94.8	81.3	14.9
Jul-11	0	1	0	2	7	9	18	4.9	6.8	131.8	10.8	11.3	301.4	12.3	1.7	10.1	1.9	90.4	94.8	6.4
Aug-11	0	1	0	2	8	10	19	3.6	6.2	85.9	4.9	6.8	131.8	14.7	1.1	12.3	1.7	73.7	90.4	9
Sep-11	0	1	0	2	9	10	20	8.8	14	228.4	3.6	6.2	85.9	12.9	1.2	14.7	1.1	82.3	73.7	24.1
Oct-11	0	1	0	2	10	11	21	14.5	12.9	334	8.8	14	228.4	12.1	1.3	12.9	1.2	60.2	82.3	24.8
Nov-11	0	1	0	2	11	11	22	10.9	10.1	304.5	14.5	12.9	334	10.8	3	12.1	1.3	58.3	60.2	26.5
Dec-11	0	1	0	2	12	12	23	16.1	18.5	465.9	10.9	10.1	304.5	8.8	2.3	10.8	3	19.8	58.3	25.31
Jan-12	0	1	0	2	1	12	24	17	11.9	306	16.1	18.5	465.9	2.5	1.6	8.8	2.3	21.4	19.8	9.8
Feb-12	0	1	0	3	2	13	25	22.3	11.3	312.6	17	11.9	306	5.7	2.7	2.5	1.6	9.2	21.4	9.3

3. Benmore spatial soil model and risk map

Loc_ code	POINT _X	POINT _Y	Shape _Leng	Shape _Area	NEAR _FID	prox_ water	prox_ traps	prox_pos _plants	prox_ buildings	prox_ paths	pos_ beds	events	pos_ event	no_ samp	no_ pos	no_ plants	no_ spec	no_ hosts	perc_ hosts
YC4	214304.3	685456.6	1315.294	9479.138	3	47.81933	263.6702	256.7506	86.73365	14.33621	0	0	NA	0	0	186	94	54	29.03226
YC1	214299.5	685547	223.0828	1802.952	2	26.19797	254.6952	249.46	32.15541	19.77897	0	0	NA	0	0	64	32	27	42.1875
YC2	214321.8	685606.8	314.7037	4403.473	55	42.98719	290.0672	286.0607	23.42879	36.70803	0	0	NA	0	0	103	66	44	42.71845
YA4	214237.3	685610.1	292.5599	2812.742	55	35.53169	213.1834	210.2024	91.61501	6.630565	0	0	NA	0	0	67	36	45	67.16418
YA2	214203.5	685638.4	267.0722	4797.08	55	77.90167	198.534	198.4833	91.4382	29.30099	0	1	0	0	0	91	59	27	29.67033
YA1	214148.8	685621.6	245.4707	3769.319	22	61.28626	144.9507	146.6979	110.463	26.72266	0	1	0	0	0	86	53	49	56.97674
YA9	214140.3	685657.9	419.4126	2463.517	22	61.14702	136.4427	138.6986	78.5194	0.366896	0	0	NA	0	0	49	36	9	18.36735
YP1	214066.3	685605	59.47547	178.5344	20	4.213237	70.56201	62.8641	140.7548	1.136651	0	0	NA	0	0	52	30	9	17.30769
YP2	214069.8	685613.3	324.0581	869.9938	20	0.916501	70.09248	68.53993	132.7261	5.667905	1	5	5	12	12	117	77	17	14.52991
YP6	214010.2	685586.2	391.9608	4444.507	9	32.95402	54.04899	7.100565	157.6904	29.10585	1	1	1	1	1	74	36	46	62.16216
YA3	214154.3	685571.2	287.5827	2306.907	22	83.38522	121.5886	118.867	159.3379	16.4394	0	1	0	0	0	44	12	31	70.45455
YP3	214076.1	685573	318.1538	3231.296	22	17.0695	65.79546	65.84445	173.372	10.2588	0	3	0	0	0	221	120	73	33.03167
YN5	214113.6	685544.4	601.2469	5349.066	22	63.12513	73.20843	70.17649	194.2751	20.65288	0	0	NA	0	0	40	1	0	0
YN3	214063.5	685522.4	293.0869	1480.125	68	53.79552	18.52782	17.02051	186.3068	9.934593	0	2	0	0	0	66	27	37	56.06061
YN4	214176.1	685535.4	219.749	926.6501	62	76.93256	130.8421	125.88	153.7314	7.854851	0	2	0	0	0	91	37	51	56.04396
YN1	214177.7	685520.1	299.4788	2440.395	62	74.02104	130.8896	125.239	156.6538	7.41776	0	2	0	0	0	109	58	42	38.53211
YN2	214040.4	685502.5	340.458	3132.176	68	44.41284	13.24704	13.55904	156.683	14.71683	1	9	9	101	86	86	45	30	34.88372
YL8	213924	685492.9	277.5054	2716.065	0	108.8684	124.8039	67.50419	56.90905	16.47743	0	1	0	0	0	90	35	47	52.22222
YL9	213946.3	685482.3	338.7434	3816.466	9	117.8571	105.6082	79.15066	64.5099	25.28804	0	1	0	0	0	96	49	56	58.33333
YC8	214017.1	685756.4	160.5339	912.9861	13	84.85602	110.7903	75.86817	1.559721	22.42675	0	0	NA	0	0	87	69	4	4.597701
YC7	214096.9	685755.9	246.3189	1650.937	39	97.40662	147.918	122.8524	10.91163	17.91216	0	0	NA	0	0	39	21	5	12.82051
YC9	214045.7	685806.4	520.63	11462.49	39	67.53918	166.9311	132.2643	10.17635	71.82087	0	0	NA	0	0	83	18	10	12.04819
YK1	213958.9	685758.8	130.2456	520.6793	13	43.43458	114.0959	81.77913	27.87805	20.92261	0	0	NA	0	0	19	16	10	52.63158
YQ1	213988.9	685683.6	284.519	2108.08	11	45.96196	34.57615	9.139437	59.45645	10.34342	1	13	13	40	27	67	42	26	38.80597
YK3	213966.8	685697.1	163.9773	849.4124	13	27.4438	53.41268	28.19888	50.4088	9.629885	0	0	NA	0	0	41	27	16	39.02439
YJ4	213760	685598.8	513.8523	5884.464	0	79.18976	196.4188	175.3848	90.62776	5.639858	0	0	NA	0	0	160	73	85	53.125
YJ5	213837	685601.5	328.2913	4726.13	0	2.477219	120.7903	102.7951	149.9094	13.90307	0	6	0	0	0	137	54	10	7.29927
YL1	213958.5	685597	340.3323	4332.917	9	15.43445	38.43945	16.91308	148.894	21.08084	1	9	9	137	55	142	30	114	80.28169
YK9	213869.7	685563.5	277.4037	1820.898	0	29.91271	109.7606	61.39963	108.0322	9.915021	0	2	0	0	0	124	27	102	82.25806
YJ6	213847.2	685568.3	211.1679	1098.484	0	29.3938	125.0715	84.18925	115.2495	7.669942	0	0	NA	0	0	45	24	27	60
YK8	213904.9	685575	206.3557	1487.64	0	27.49523	76.90352	30.10533	124.2127	8.322951	1	4	4	8	8	96	30	76	79.16667
YK6	213931.2	685619.5	175.5361	1129.709	2	12.63165	26.80496	14.85773	135.8032	11.516	1	13	7	34	10	79	18	65	82.27848
YK7	213914	685655.5	308.9037	3176.701	4	4.166576	44.0219	39.08596	114.2941	18.19405	1	4	3	4	4	147	54	103	70.06803
YK2	213954	685725.6	119.0033	545.5382	13	14.60994	84.65254	48.2603	37.84491	8.959011	1	4	3	4	4	33	22	18	54.54545
YK5	213951.5	685661.5	139.4464	833.2004	13	18.24986	26.5259	17.41274	89.13247	13.58978	1	13	7	34	10	35	15	6	17.14286
YK4	213945.4	685683.1	144.0307	386.6298	13	5.838815	48.73233	5.170511	73.23407	0.894221	1	6	6	28	28	31	17	23	74.19355
YL2	213899.6	685532.2	277.7002	3019.881	0	63.90612	115.8851	41.97537	81.81513	15.2715	1	1	1	1	1	124	47	83	66.93548
YM1	213924.9	685376	624.963	15896.9	68	162.8669	184.2422	184.0893	57.65319	54.31988	0	0	NA	0	0	96	43	24	25

YL7	213834.4	685397.4	145.4591	1166.056	0	198.0389	242.497	189.1349	22.12208	12.41964	0	0	NA	0	0	28	16	13	46.42857
YL6	213856.3	685458.9	196.3535	1312.413	0	134.4967	198.5596	125.7673	9.90208	12.70188	0	0	NA	0	0	42	17	34	80.95238
YL3	213859.7	685493.5	244.8648	1957.089	0	99.71363	169.495	97.50203	39.64036	15.14765	0	0	NA	0	0	64	31	46	71.875
YL5	213819.3	685463.5	145.4356	1245.335	0	137.084	217.4483	147.6002	35.38256	15.95011	0	0	NA	0	0	22	9	11	50
YG1	213798	685420.9	198.5749	1199.321	0	184.3511	264.3293	192.4543	44.50996	10.06901	0	0	NA	0	0	46	22	38	82.6087
YL4	213821.6	685506.1	290.2463	2022.4	0	96.47845	184.0623	121.9519	67.89704	8.593016	0	1	0	0	0	101	31	83	82.17822
YJ3	213783.8	685506.8	210.4783	1570.507	0	110.7949	212.2732	156.4912	90.4521	11.96991	0	0	NA	0	0	82	35	48	58.53659
YJ7	213777	685534	273.8699	2190.228	0	92.67425	202.9235	156.1666	115.2941	9.980022	0	4	0	0	0	76	43	39	51.31579
YJ2	213727.7	685531.7	331.9497	2222.232	0	132.1261	247.8682	205.2884	98.15354	12.79183	0	0	NA	0	0	98	55	67	68.36735
YJ1	213699.6	685540.3	350.669	3754.838	0	152.793	270.4962	232.2195	75.79925	14.29773	0	0	NA	0	0	179	71	103	57.5419
YJ8	213644.2	685585.7	341.7196	3173.953	0	195.549	312.6689	287.9133	30.38562	37.93725	0	0	NA	0	0	32	15	4	12.5
YG4	213639.5	685530.4	404.2178	6177.524	0	212.2844	330.4992	293.0131	82.62358	41.91007	0	0	NA	0	0	114	52	23	20.17544
YG5	213631.4	685465.4	345.0651	7107.501	0	248.99	363.5724	314.1697	147.3484	49.06485	0	0	NA	0	0	101	29	6	5.940594
YG3	213724.5	685461.3	414.4533	4382.164	0	182.108	287.0654	228.9114	121.0005	23.03242	0	0	NA	0	0	138	73	64	46.37681
YG8	213616.4	685365.7	613.5637	12701.16	58	318.2566	431.0377	369.7344	234.2203	9.777038	0	0	NA	0	0	177	53	46	25.9887
YT2	213532.1	685349.3	447.7623	10274.59	58	232.8435	508.7703	451.1909	292.0007	4.80133	0	0	NA	0	0	113	32	2	1.769912
YG2	213768.3	685425.5	306.3466	3820.407	0	190.8857	279.2669	211.0725	73.36035	19.68807	0	0	NA	0	0	131	48	109	83.20611
YH4	213761.3	685319.6	219.6711	2206.012	0	292.0882	345.5754	294.2811	128.7933	14.43509	0	0	NA	0	0	54	26	47	87.03704
YH3	213737.9	685342.7	266.0508	2340.284	0	279.0831	353.3815	290.6885	132.6312	15.08987	0	0	NA	0	0	37	19	26	70.27027
YG7	213734.1	685395.2	202.4107	2184.47	0	232.6248	324.6648	256.7402	113.0185	17.71958	0	0	NA	0	0	77	25	66	85.71429
YF1	213774.3	685271.9	297.7133	3237.667	0	333.6606	364.6793	327.9882	159.7514	14.40998	0	0	NA	0	0	90	34	49	54.44444
YF3	213811.7	685363.8	269.6054	3008.864	0	235.3478	279.1004	229.5771	62.14189	19.00902	0	0	NA	0	0	105	41	83	79.04762
YE1	213845.4	685271.8	130.6313	796.0698	68	287.9722	315.1193	300.6328	136.3935	10.06709	0	0	NA	0	0	17	14	6	35.29412
YF2	213790.2	685263.3	313.5906	977.0936	68	337.1027	358.8942	328.4107	160.6445	6.087926	0	0	NA	0	0	38	19	21	55.26316
YF4	213808.8	685259.2	394.8601	4715.492	68	324.4092	348.7476	324.628	157.5519	11.92735	0	0	NA	0	0	69	41	42	60.86957
YF5	213762.4	685169.8	319.7567	4730.242	68	417.7613	446.6094	425.0625	257.8425	21.90497	0	0	NA	0	0	56	15	19	33.92857
YE2	213833.9	685218	148.2898	1066.596	68	332.9234	364.7309	355.5069	191.2897	10.22883	0	0	NA	0	0	40	27	29	72.5
YE3	213861.4	685210.4	243.1991	2856.842	68	319.9433	355.8542	354.8011	196.6437	13.95199	0	0	NA	0	0	106	50	48	45.28302
YE5	213864.4	685122.2	401.4428	6532.872	64	334.1516	432.2713	430.3402	284.8096	25.74098	0	0	NA	0	0	100	45	31	31
YH6	213575	685254.6	337.2483	5383.917	58	281.0504	536.2897	469.0656	317.7484	28.36056	0	0	NA	0	0	121	36	59	48.76033
YU2	0	0	356.4383	3948.959	0	304.6604	389.8328	323.6021	168.9139	21.66475	0	0	NA	0	0	163	36	11	6.748466
YF4	0	0	389.8427	5828.955	0	464.6848	523.5783	501.649	333.9097	7.865912	0	0	NA	0	0	69	41	42	60.86957
YE4	213810.4	685133.2	284.6265	4322.362	64	383.3688	448.3215	443.5259	278.9185	5.034132	0	0	NA	0	0	68	37	35	51.47059
YE5	213812.8	685028.6	491.275	10668.27	64	417.768	538.9246	537.0829	381.7422	19.59265	0	0	NA	0	0	115	47	9	7.826087
YT1	213508.2	685444.2	505.2331	11951.7	30	224.8812	484.0469	438.4216	225.988	32.48063	0	0	NA	0	0	43	19	8	18.60465
YH5	213647.6	685274.6	310.4493	3743.225	58	349.8568	465.6766	402.2234	245.482	20.88901	0	0	NA	0	0	115	45	44	38.26087
YF7	213688.5	685229.6	445.9765	6677.78	58	397.2981	457.583	409.8166	244.2611	11.56299	0	0	NA	0	0	323	99	49	15.17028
YS2	213562.9	685101.6	498.016	5912.137	27	322.7852	635.9973	587.9509	423.5476	9.473856	0	0	NA	0	0	64	21	24	37.5
YU4	213342.2	685381.3	559.2849	6295.715	32	50.46902	661.3523	615.2796	392.265	8.443656	0	0	NA	0	0	351	38	2	0.569801
YU2	213703.3	685330.1	271.2849	3699.584	27	25.53844	765.989	715.1891	402.2175	7.796656	0	0	NA	0	0	163	36	11	6.748466
YU3	213275.7	685356.4	206.4897	1332.723	32	15.36794	732.3511	686.1884	377.699	7.516856	0	0	NA	0	0	51	18	0	0
YU6	213325.5	685409.9	506.0749	3398.536	32	44.83329	666.6508	623.8206	390.3912	3.636078	0	0	NA	0	0	208	9	0	0
YU1	213299.6	685271.1	204.9774	1908.539	27	12.44101	747.9509	694.4054	441.7784	1.724755	0	0	NA	0	0	126	25	10	7.936508
YU5	213361.9	685352.2	429.6744	4321.529	32	63.83519	655.2385	605.8212	395.0228	15.95656	0	0	NA	0	0	403	39	9	2.233251

YS3	213639	685136.9	400.4784	4637.522	27	376.9645	555.5465	514.0509	347.28	2.597911	0	0	NA	0	0	220	69	17	7.727273
YF6	213669.5	685179.2	407.2982	6802.691	58	392.5726	504.5548	461.9128	295.1638	13.49118	0	0	NA	0	0	124	53	11	8.870968
YS4	213540.5	685154.8	559.7116	6234.035	27	278.6808	620.9269	562.7195	403.1732	10.80106	0	0	NA	0	0	377	98	53	14.05836
YF8	213516.5	685184	388.6544	5346.645	27	245.7413	624.7827	559.6532	404.8335	3.146923	0	0	NA	0	0	146	56	12	8.219178
YS1	213389.9	685193.7	724.1127	12984.83	27	127.1963	715.4314	653.4396	497.6455	9.638405	0	0	NA	0	0	182	53	34	18.68132
YS5	213453.9	685208.7	237.7448	2426.547	27	178.5382	656.3225	592.4275	446.0615	12.42712	0	0	NA	0	0	54	13	11	20.37037
YS6	213478.1	685245.8	240.928	3208.212	58	189.9434	614.0434	551.2502	407.6746	35.85797	0	0	NA	0	0	80	18	0	0
YT3	213505.3	685258.3	241.3535	1565.264	58	212.2745	585.1013	521.775	377.7414	8.01478	0	0	NA	0	0	52	9	0	0
YS7	213417.3	685306.6	675.2821	15651.97	58	117.7738	628.3009	572.7521	389.7401	7.768537	0	0	NA	0	0	174	46	44	25.28736
YQ8	214078.1	685704.3	122.3195	228.8471	22	77.82849	97.34553	82.89375	42.5391	11.86028	0	0	NA	0	0	22	7	4	18.18182
YQ9	214081.5	685680.3	121.7772	224.0812	22	53.66007	86.44966	83.51403	66.65185	12.30531	0	0	NA	0	0	27	7	7	25.92593
YQ7	214116.1	685692.4	72.89225	143.5288	22	71.39365	122.8153	118.437	53.64884	6.068739	0	0	NA	0	0	31	9	1	3.225806
YQ6	214115.2	685702.8	71.29031	134.9316	22	80.67172	126.8068	118.8353	44.25576	4.278023	0	0	NA	0	0	31	14	6	19.35484
YQ2	214040.1	685634.9	129.9124	389.3408	22	24.62054	35.41586	37.17839	110.4233	6.036441	0	1	0	0	0	8	2	0	0
YR1	214049.4	685682.8	48.36794	84.58448	22	65.24587	61.63119	51.38202	63.08976	4.599673	0	0	NA	0	0	10	9	1	10
YR2	214047.9	685692.3	49.07208	89.8691	22	74.73941	67.67593	50.76312	53.44837	5.096052	0	0	NA	0	0	12	9	0	0
YR5	214004.1	685653.6	102.2916	192.9258	11	37.04877	13.6021	15.39473	90.10795	6.816029	0	1	0	0	0	30	11	6	20
YR6	213995.9	685707.3	110.7943	215.6604	13	54.85368	58.59589	24.39471	36.0508	6.056201	0	1	0	0	0	47	20	6	12.76596
YR3	214037	685662.8	93.1141	186.3135	22	50.91514	39.30201	42.09414	82.4303	21.99918	0	0	NA	0	0	45	27	3	6.666667
YR7	214019.8	685669.9	114.9038	228.8417	11	58.40444	33.35424	25.41677	74.53982	10.61421	0	0	NA	0	0	48	20	5	10.41667
YR8	214013.8	685706.9	164.1296	314.2187	13	72.75404	62.61541	28.6568	37.26778	11.6178	0	0	NA	0	0	55	19	4	7.272727
YR4	214032.6	685714.6	155.8217	328.8312	13	91.64426	78.17336	46.81001	30.5209	19.7147	0	0	NA	0	0	75	47	14	18.66667
YQ3	214122.1	685679.8	287.7718	718.1257	22	63.07631	123.646	124.1243	64.59421	9.542097	0	0	NA	0	0	13	4	0	0
YA8	214216.6	685721.2	1240.945	10156.3	55	71.15862	226.6841	221.95	20.68947	36.06268	0	0	NA	0	0	90	65	44	48.88889
YC10	214292	685313.2	501.73	11442.83	28	88.09529	316.8145	309.0045	166.3527	157.006	0	0	NA	0	0	37	16	18	48.64865
YU1	0	0	331.7843	2481.127	0	318.1837	412.6365	344.1533	194.1738	12.06389	0	0	NA	0	0	126	25	10	7.936508
YY0	214015.2	685799.8	132.5852	531.998	66	81.82596	152.845	118.0131	14.45927	65.44542	0	0	NA	0	0	897	261	157	17.50279
YP5	214029	685591.9	120.6539	133.367	22	19.48011	53.76008	24.06745	152.8716	14.9269	0	0	NA	0	0	79	58	18	22.78481
YC3	214253.1	685554.3	445.8898	1845.282	62	2.188918	210.0127	205.1717	74.60506	6.660445	0	0	NA	0	0	52	30	4	7.692308
YC5	214375.7	685357.4	758.7656	10383.36	13	116.8622	364.1192	356.5576	167.9367	123.2043	0	0	NA	0	0	34	14	18	52.94118